E 6356 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2019

Sixth Semester

Core Course—SOLUTION CHEMISTRY

(Common for B.Sc. Chemistry Model I and Model II, B.Sc. Petrochemicals and B.Sc. Chemistry Environment and Water Management)

[2013 Admission onwards]

Time : Three Hours Maximum Marks : 60

Section A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. ———— is an example of non-ideal solution showing negative deviation from ideal behaviour.
2. Give an example for maximum boiling azeotrope.
3. What is the expression for the solubility product of calcium phosphate.
4. How is the hydrolysis constant (K_h) of a salt of weak acid and a strong base related to the ionization constant (K_a) of the acid and ionic product of water K_w.
5. ———— is an example for hard acid.
6. The specific conductance of a solution ———— with dilution.
7. Represent the calomel electrode.
8. What is the relation between free energy change and EMF of a cell reaction ?

(8 × 1 = 8)

Section B

Answer any **six** *questions.*

Each question carries 2 *marks.*

9. State Henry's law.
10. What is meant by positive elviation from Rault's Law ?
11. State Ostwald's dilution law.
12. Explain the term electrophoretic effect implied in Debye-Huckel theory of strong electrolyte.
13. Explain the howry-Bronsted concept of acids and bases.
14. Explain with example, the use of the concept of solubility product in qualitative analysis.

Turn over

15. What is a concentration cell ? Give one example.
16. What is transport number ?
17. What is meant by potentiometric titration ? Sketch the general shape of potentiometric titration curve for a strong acid. Strong base titration.
18. What is electrochemical series ?

(6 × 2 = 12)

Section C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. Calculate the Osmotic pressure of 20 % anhydrus calcium chloride solution at 273 K, assuming that the solution is completely dissociated (R = 0.082 lit. atm K^{-1} mol^{-1}).
20. Calculate the electrode potential of a copper wire clipped in 0.1 molar copper sulphate solution at 25°C. At this temperature, the standard electrode potential of copper is 0.34 V (F = 96500 columbs, R = 8.314 $Jule^{-1}$ $degree^{-1}$ mol^{-}). Assuming $CuSO_4$ to be completely ionized and the activity of copper ion equal to the molar concentration.
21. Discuss the variation of molar conductance with dilution in the case of strong and weak acid.
22. Calculate the mean ionic activity coefficient of 0.01 M $LaCl_3$ in water at 25° A = 0.509.
23. What is over voltage ? Discuss the application of over-voltage in corrosion of metals.

(4 × 4 = 16)

Section D

Answer any **two** *questions.*
Each question carries 12 *marks.*

24. Illustrate with diagram pressure composition curve for non-used solution.
25. Discuss the applications of conductance measurements.
26. Derive an expression for EMF of electrode concentration cell without transference.
27. What are the different methods for corrosion prevention ? Discuss.

(2 × 12 = 24)